

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing
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Applicant's or agent's file reference

13652.I WOU1

IMPORTANT NOTIFICATION

International application No.

PCT/US03/40646

International filing date (day/month/year)

19 December 2003 (19.12.2003)

Priority date (day/month/year)

19 December 2002 (19.12.2002)

Applicant

KARGES-FAULCONBRIDGE, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US

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Form PCT/IPEA/416 (July 1992)

EXHIBIT

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 13652.1 WOU1	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/40646	International filing date (day/month/year) 19 December 2003 (19.12.2003)	Priority date (day/month/year) 19 December 2002 (19.12.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): F26B 3/00 and US Cl.: 34/340		
Applicant KARGES-FAULCONBRIDGE, INC.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>5</u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 15 July 2004 (15.07.2004)	Date of completion of this report 17 November 2004 (17.11.2004)	
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Joseph W. Drodge DEBORAH A. THOMAS PARALEGAL SPECIALIST Telephone No. 571-272-1700 GROUP 1300 <i>Det</i>	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/40646

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-31 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the claims:
pages NONE, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages 32-36, filed with the letter of 18 October 2004 (18.10.2004)

- ☒ the drawings:
pages 1-11, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. 19-20
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/40646**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>1-18</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>1-18</u>	YES
	Claims <u>NONE</u>	NO
Industrial Applicability (IA)	Claims <u>1-18</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-18 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry. Claims 1-20 have usefulness in the industrial arts of preparing micro or nanoparticles for the pharmaceutical or agricultural industries.

Claims 1-12 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest does not suggest a method of drying solids including the steps of providing a feedstream with solids, a first solvent and water in the interstitial spaces of the solids, the solvent having a relatively low heat of vaporization and soluble with the water, displacing the water with the first solvent and combining the feedstream with a second solvent that in turn displaces the first solvent with the second solvent in the interstitial spaces, *in which the second solvent has a lower heat of vaporization than the first solvent and is miscible with the first solvent.*

The closest prior art, Tiech et al patent 6,438,867, of record, does not suggest using sequential solvents with a succeeding solvent(s) having relatively lower heat of vaporization and miscible with former solvent(s).

Claims 13-18 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest in a process of drying solids, providing a feed stream having the solids, water in the interstitial spaces of the solids and a first solvent, displacing the water with the first solvent, then combining with a second solvent and displacing the first solvent with the second solvent, *in which the first solvent is ethanol and the second solvent is one of ether or n-propyl bromide, and then removing the second solvent from the solids by application of heat.* Tiech et al does not suggest sequential application of ethanol solvent followed by ether or n-propyl bromide solvent followed by application of heat.

----- NEW CITATIONS -----

1 PBA/W

WE CLAIM:

1. A process for drying solids initially wet with water, the process comprising:
 - (a) combining a feed stream with a first solvent, the feed stream comprising solids having interstitial spaces therebetween and water present in the interstitial spaces, the first solvent having a heat of vaporization lower than the heat of vaporization of water and being soluble with water;
 - (b) displacing the water present in the interstitial spaces with the first solvent to provide solids having the first solvent in the interstitial spaces;
 - (c) combining the feed stream having the first solvent in the interstitial spaces with a second solvent, the second solvent having a heat of vaporization lower than the heat of vaporization of the first solvent and being miscible with the first solvent; and
 - (d) displacing the first solvent present in the interstitial spaces with the second solvent to provide solids having the second solvent in the interstitial spaces.
2. The process according to claim 1, further comprising the step of:
 - (e) removing the second solvent from the interstitial spaces of the solids by the application of heat.
3. The process according to claim 1, wherein the step of combining a feed stream with a first solvent comprises:
 - (a) combining the feed stream with a first solvent that is an alcohol.
4. The process according to claim 3, wherein the step of combining a feed stream with a first solvent that is an alcohol comprises:
 - (a) combining the feed stream with a first solvent that is ethanol.

5. The process according to claim 3, wherein the step of combining the feed stream with a second solvent comprises:
 - (a) combining the feed stream with a second solvent that is a halogenated hydrocarbon.
6. The process according to claim 5, wherein the step of combining the feed stream with a second solvent comprises:
 - (a) combining the feed stream with a second solvent that is n-propyl bromide.
7. The process according to claim 3, wherein the step of combining the feed stream with a second solvent comprises:
 - (a) combining the feed stream with a second solvent that is an ether.
8. The process according to claim 7, wherein the step of combining the feed stream with a second solvent that is an ether comprises:
 - (a) combining the feed stream with a second solvent that is one of ETBE and MTBE.
9. The process according to claim 1, wherein:
 - (a) combining a feed stream with a first solvent comprises combining a feed stream with an alcohol;
 - (b) combining the feed stream with a second solvent comprises combining the feed stream with n-propyl bromide; and the process further comprises:
 - (c) obtaining an ether product that is at least 95% pure n-propyl bromide; and
 - (d) obtaining an alcohol product that is at least 90% pure alcohol.
10. The process according to claim 9, wherein:
 - (a) combining a feed stream with an alcohol comprises combining with ethanol; and

- (b) obtaining an alcohol product that is at least 90% pure alcohol comprises obtaining an alcohol product that is at least 95% pure ethanol.

11. The process according to claim 1, wherein:

- (a) combining a feed stream with a first solvent comprises combining a feed stream with an alcohol;
- (b) combining the feed stream with a second solvent comprises combining the feed stream with an ether; and the process further comprises:
- (c) obtaining an ether product that is at least 95% pure ether; and
- (d) obtaining an alcohol product that is at least 90% pure alcohol.

12. The process according to claim 11, wherein:

- (a) combining a feed stream with an alcohol comprises combining with ethanol; and
- (b) obtaining an alcohol product that is at least 90% pure alcohol comprises obtaining an alcohol product that is at least 95% pure ethanol.

13. A process for drying solids initially wet with water, the process comprising:

- (a) providing a feed stream comprising solids having interstitial spaces with water and ethanol present in the interstitial spaces;
- (b) providing an ethanol source stream;
- (c) providing a second source stream, the second source stream being either an ether source stream or an n-propyl bromide source stream;
- (d) displacing the water present in the interstitial spaces with the ethanol source stream to provide solids with ethanol in the interstitial spaces;
- (e) displacing the ethanol present in the interstitial spaces with either ether or n-propyl bromide to provide solids with either ether or n-propyl bromide in the interstitial spaces; and
- (f) removing the ether or n-propyl bromide from the solids by the application of heat.

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14. The process according to claim 13, wherein said step of displacing the water present in the interstitial spaces with the ethanol to provide solids with ethanol in the interstitial spaces comprises:

- (a) in a solid-liquid extractor, displacing the water present in the interstitial spaces with the ethanol to provide solids with ethanol in the interstitial spaces; and
- (b) obtaining an aqueous stream comprising the water and ethanol.

15. The process according to claim 14, further comprising:

- (a) feeding the aqueous stream to a liquid-liquid extractor;
- (b) providing a third source stream, the third source stream being either an ether source stream or an n-propyl bromide source stream; and
- (c) processing the aqueous stream and the third source stream in the liquid-liquid extractor to obtain an aqueous bottom stream comprising water and ethanol and a top organic stream comprising ether or n-propyl bromide and ethanol.

16. The process according to claim 15, further comprising:

- (a) distilling the aqueous bottom stream to obtain an ethanol stream and a water stream.

17. The process according to claim 13, wherein said step of displacing the ethanol present in the interstitial spaces with either ether or n-propyl bromide to provide solids with either ether or n-propyl bromide in the interstitial spaces comprises:

- (a) in a second solid-liquid extractor, displacing the ethanol present in the interstitial spaces with ether or n-propyl bromide to provide solids with ether or n-propyl bromide in the interstitial spaces.

18. The process according to claim 13 for drying solids from a beer stream initially wet with water, the process comprising:

- (a) providing a beer stream comprising solids having interstitial spaces with water and ethanol present in the interstitial spaces;

- (b) providing an ethanol source stream;
- (c) providing a second source stream, the second source stream being either an ether source stream or an n-propyl bromide source stream;
- (d) displacing the water present in the interstitial spaces with the ethanol source stream to provide solids with ethanol in the interstitial spaces;
- (e) displacing the ethanol present in the interstitial spaces with either ether or n-propyl bromide to provide solids with either ether or n-propyl bromide in the interstitial spaces;
- (f) removing the ether or n-propyl bromide from the solids by the application of heat; and
- (g) obtaining:
 - (i) an ethanol stream that is at least 95% pure ethanol;
 - (ii) a solvent stream that is at least 95% pure ether or n-propyl bromide;
 - (iii) a water stream; and
 - (iv) an oil stream.